For INTERNAL EXAMINER

CONSTRUCTION

OF

MUSICAL APTITUDE TEST

Dissertation Work Submitted

BY

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UNDER GUIDANCE OF

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C E R T I F I C A T E

This is to Certify that Smt. PADMA NALGUNDWAR, student of M.Ed. Roll No. 7, has completed her dessertation work under my supervision and guidance. This dessertation work is being submitted as a partial fulfillment for her M.Ed. Examination 1974 of Bhopal University, Bhopal.

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P R E F A C E :

Music though being an interesting and important subject, has been receiving a trivial attention consequent to wich very few research work has been done specially in the field of Musical Aptitude.

Investigator feels that

a) music being difficult, demanding arduous training and perseverance.

b) Limited avenues being open for employement in this field.

and c) barring few eminent and out standing musicians, the occupation does not carry much prestige in the society.

musical aptitude testing appears to be practically out of testing programmes.

Very few studies and that too based on western music have been done. But then those foreign tests are not easily available. Lots of formalities have to be observed for placing an order for them. Thus those tests have proved to be out of reach and costly. Besides all those tests are based on western music, It would not be worthwhile to go into the details of the difference between the western music and Hindusthani music here.

The investigator earnestly feels that promising musicians are to be detected inorder to encourage them, to assist them and to guide them for their successful career in music.

Under the circumstances a local tool detecting musical aptitude has to be devised which is totally based on Hindusthani music system.

With all humiliation to my credit but confidence of success at my command, I have endeavoured to put forth a test to assess the aptitude towards music amongst the schoolgoing children. The details of the test have been given in the subsequent chapters and appendices.

I am indeed grateful to my guide Shri S.N.TRIPATHI, Reader in Education, Regional college of Education Bhopal for his continued able guidance and keen interest taken in this new ~~gui~~ field of study. I am indebted to Dr. P.N. CHINCHORE, an eminent musician, an authority in music and ex - vicechancellor of Indira Kala Vishwa-vidhyalaya Khairagarh, but for whose encouragement and blessings it would not have been possible for me to put up this effort on my part. I am thankful to Dr. GOPALRAO reader Regional college of Education Bhopal for his keen interest and guidance given from time to time in my endeavour. I shall be failing in my duty if I do not not place on record my sincere thanks to Dr. J.S. GREWAL Reader Regional college of Education, Bhopal, Dr.D.N.Bhargav ~~Ed~~ lecturer Regional college of Education Bhopal, The principal, Teachers and the students of the Model High School Bhopal for their assistance in implementation and administeration of the Test.

BHOPAL

Dated 21st June 1974.

Padma Nalgunchwar

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CHAPTER I

INTRODUCTION.

IMPORTANCE OF MUSIC :

In most cultures men use music when they wish to Transcend, to utilise, to contact with that which is immortal. They use it to help them in ritual or worship which will gain for them strength, vision or other quality which is ordinarily beyond that of their everyday existance. They use, music to entreat duties to do for them what they can't do for themselves.

Individuals of a group are more closely integrated by use of group music with rituals.

Music is basically a means of communication. It is far more subtle than mere words. It communicates about feelings in a way that words can not. One has less hasitation to use music to express which one never expresses in words.

Music dissipates loneliness. It frees one from one's environmental and material confiness and diverts. It may even help one free oneself from pains.

For the most part, moods elicited by music are derived from tender emotions which includes love, lovemaking, affection and subsequent respect for parents, religion, patriotism, loyalty and similar relationship held in great esteem by our culture.

The uses of music are varied and many. It would not be a matter of exageration to say that music should

be one of the core subjects in school curriculum and for that good and well trained music teachers are necessary not only for producing musicians but those teachers should enable all to enjoy listening music if proper training is given.

It is obligatory on education to find out potential elites in music and develop their special ability to the maximum which would be beneficial not only to them but the society also.

Unfortunately due to lack of research, lack of interest and due to many wrong associations with music (e.g. eccentricity is characterless not poverty) we have to face the music performed by horrible singers who are least capable for it and we have also to miss the music w hich otherwise w-e have enjoyed had the budding potentials been identified and trained properly.

The preceeding discussion on importance of music necessitates us to find out the potentials in music.

Ethemologically the word music is derived from the urdu w-ord " Musike " which means that which amuses.

Of all the fine arts music happens to be most intimate and fullest expressions of all natures. It was, it is and it shall be a vital factor in human society whether undeveloped, tribal uncivilised, rural or civilised anstocratic, sofisticated.

The beauty of music is an address to inward

mind and has existance in mental conciousness, It translates mental world into ideal world and since being least material of all arts, surpasses all arts and as such it is aptly called as art of all arts. It has that magic instrumentality by which individuals mind reveals to his senses the mysteries of beauty. It aptly serves as a shock absorber for an individual for smooth running of life and to achieve mental equillibrium.

Music makes a significant and unique contribution to the general education.

1. It contributes to aesthetic growth.
2. It contributes to productive use of leisure time and
3. It contributes to emotional development.

Music has not only emotional and aesthetic value but it also has therapeutic and economic values.

Emotionally disturbed child must be helped to reestablish his relationship with people and world and music proves to be the medium whereby access to the real child and not his pathological facade is gained. Due to social inadequacy, it is often forgotten that mentally retarded children have emotional life, they love, they hate, theyfeel rejected.

One study of effects of musical training for mentally difficient child gave evidence of both social and emotional benefits indicative of progress towards social competance.

Jullictre Alwin has demonstrated that with proper musical stimulation in an appropriate setting subnormal children can accomplish Tastes such as writing, remembering certain items of their school which they were not able to do before.

It has been observed by a botanist that plants grow rapidly due to music.

Basavraj Rajguru, the eminent musician, narrated an interesting experience of effect of music on animals. For one week regularly he sang classical music before cows and to his great surprise he saw that music was effective for increase in the quantity of milk.

Few researches have been done over the issue which would subsequently be dealt with. But in India hardly any research on musical aptitude test ha s been done, partly because of the limited avenues open and current education having vocational bias and partly because of our value system. However immediate problem which now faces us is to devise tools and techniques to find out musical aptitude.

In order to devise tool for measuring musica-l aptitude one must be clear about the nature of aptitude and subsequently musical aptitude.

The nature and meaning of aptitude.

The nature and meaning of musical aptitude will be crystal clear through the various definitions given below by eminent psychologists.

1. According to Bingham (1937) " Aptitude is a condition or a set of characteristics regarded as symptomatic of an individuals' ability to acquire with training some usually specified knowledge, skill or set or responses."

2. According to FREEMAN (1950)

" Aptitude is a combination of characteristics indicative of individuals capacity to acquire with training some specific knowledge, skill or set of organised responses. It indicates person's potential ability for performances of certain types of activities of special kind with restricted range."

3. English and English define aptitude as a " capacity to acquire profeciency with given amount of training formal or informal."

4. VAN DUSEN defines aptitude as " measures of probable rate of learning which results in interest and satisfaction."

5. ENCYCLOPEDIA BRITANIA has given most comprehensive definition of aptitude. It is as follows :-

" Aptitude is an attempt to determine and measure those characteristics of persons that are regarded as indices of his capability to acquire through future training some specific set of responses, intellectual muscular. Aptitude test assumes that people differ in special abilities and those differences are related in predictable manners to their later achievement."

SPECIAL CHARACTERISTICS OF APTITUDE :

(1) It is a present condition, a pattern of trails deemed to be indicative of one's potentialities with forward referances.

(2) It connotes more than potential ability in preferences. It implies fitness, suitability for activity in question.

(3) It envisages symptoms of ability to acquire gennine absorption in work.

(4) Aptitude is a constilation quality characteristics of a person and it essentially is an aspect of personality.

(5) It is a contribution of nature and nurture. Nurture refines through its environmental factor upon inherited traits of individuals.

(6) It is more or less constant like intelligence quotient. Variations occur within frame work of environmental factor.

(7) Aptitudes are pluralistic and not unitary indicating that individuals have number of characterstics which can be identified through factor analysis.

(8) T.L. KELLY identified seven types of abilities indicative of pluralistic aptitudes.

THURSTONE identified eight factors

In addition to these eight factors SUPER added few more.

(8) Modern Psychologists now agree that aptitude as " Pure ability " is difficult to be analysed. It would always be a mixture of inborn potentialities and experiences.

Thus distinction between achievement and aptitude has been merged. It is assumed that both aptitude and achievement are predictive and evaluative, simple and minor differences is that where as achievement puts emphasis on the knowledge which is acquired, aptitude goes a slep ahead and refers to future possibilities more.

Purpose of Aptitude Test

If all students enrolled in the course of instruction had identified aptitude interests and motivations and if they had been subjected to the same environmental forces, no differences among them would be revealed either at the beginning or at the end of the course. The very nature of the organisation of our educational syste, however, ensures that the students will differ in relevant characteristics both before and after exposure to particular segments of subject matter. If individual did not vary the field of testing would never had been developed. Faced with differences in capacities; however, educaters and Psychologists became interested in how to measure them and in what types recommendations could reasonably be made upon the basis of these measurements.

MUSICAL APTITUDE :

Music is not a career which merely is based on surface interest on a determination. Many instances are there

where persons have resolved to be good musicians, they seek best possible training still have little success in their music career.

Like other aptitudes good sensory capacity, manual skill discrimination capacity, rythm sense, total memory are required for musical aptitude. Music aptitude or talent is not one but hierarchy of potentials varied and interrelated.

Following are important traits required for sucess in music.

1. Manual skill - It is specifically required for instrumental music.

2. Energy out put and perseverance - It is very important because for the practice of music one has to engage oneself for long durations.

3. Creative imagination -

It is required in composition of new work, interpreting existing work and for rendering ragas.

4. Emotional sensitivity -

It is important since a musician effectively portrays feelings and play upon other's emotions.

6. Intelligence -

It is important at high level musical endeavour and important in mastering more abstract aspects of music.

6. Physical capacities -

Specially auditering all bars.

7. Rythm sense -

The idea of rythm ((laya) is peculear to music.

Constant rotations of planets, the cycles of time, the heart beats, the rotating machines all exibit rythm.

Rythm plays a vital role. It first of all regulates the movements of notes but for which music would be merely flourishing of notes in the wilderness.

Secondly it gives vitality to musical piece otherwise music would be a body without bone. It is just like a crossthread which weaves through the lengthwise threads of notes.

Musical aptitude to some extent is envisaged through rythm sense.

8. Pitch discrimination :

It is a power of discriminating between two notes.

In Indian music there are mainly seven swaras and each swar has different number of shrutis. They are as follows :- as ~~follows~~ Swar " Sa " has four shrutis; swar 'Rikhab' has three shrutis; swar 'Gandhar' has two shrutis; swar 'Madhyam' has four shrutis; swar 'Pancham' has four shrutiesj swar 'Dhaiwat' has three shrutis; swar 'Nishad' has two shrutis. Shrutis actually show the range of swara and it is assumed that discrimination between the swaras and shrutis is special feature of musical aptitude.

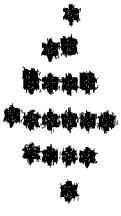
9. Tonal memory :

Mr. B. Joshi in his book " understanding Indian Music " has described tonal memory as a power of reproducing the exact tune or swaras either with the notation or without notation. (Reproduction of swaras with notation

requires a bit of musical training). It implies the recognition of the same notes as well as the discrimination between the two swaras (either high or low)

It would be a huge and eloborate task to devise or to construct a test which would measure all the capacities, physical as well as mental, mentioned about. The investigator being fully aware of her limitations of time as well as finances, has tried her best to devise a simple tool which would measure Rythm sense, pitch discrimination and Tonal memory which are supposed to be basic for elegibility for musical training.

The investigator has attempted to objectify the techniques used by Indian music teachers in finding out students who are thought to be capable of having training in music. For administering and scoring this test no background knowledge or training in music is necessary.



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CHAPTER : II

PREVIOUS RESEARCHES ON MUSICAL APTITUDE :

PREVIOUS RESEARCHES ON MUSICAL APTITUDE :

Music though being an interesting and important subject, has been receiveing a trivial attention and consequently very few researches which can be counted on fingers have been done, specifically on Musical Aptitude.

Investigator feels that following may be some of the reasons why Music has been receiving least cognizence.

(i) Music is, by nature, a difficult subject and for those who intend to make it as their career, it demands a longer and more arduous training than that for almost any other profession. It requires a life long study and education.

(ii) Because of the limited avenues for employment, very little attention has been paid so far to this subject. Moreover, barring a few outstanding musicians, the occupation does not carry much prestige in the society.

However the following studies in the field of Musical Aptitude have been made so far Brief discription of those studies how been given below :

(i) Drake Musical Aptitude Tests.

The test has been prepared by Drake in the year 1954 - 57. It is meant for children of eight years and above.

The test measures (i) Musical memory (ii) Rhythem.

It has two forms A and B .

Musical memory test is identical with Drake's " Musical memory test."

Manuals having instructions and scoring are available.

Drake views Musical memory and Rhythem as the fundamental components of musical ability.

These tests, as Drake comments do not measure all factors inherent or acquired, neither they are the measures of creative and interpretative abilities.

They are pure and functional from multiple factor analysis study.

The purpose of this test as William Larson comments, is to provide prognostic measure which would help music staff in selecting students who will profit most from instrumental training.

The test is a readiness test on the premise that those who are proficient in the fundamentals of musical notation, will be the best prospects for instrumental instruction.

The scores on this test are not measures of native ability but rather a reflection of musical aptitude of a student to profit from the common core of musical experience plus his developed skill coming from special tutelage.

The test appears to be superior to other currently available tests.

The number of each test is announced on the phonograph record to prevent the subject from loosing his place which has always been a problem in seashore's test; particularly when young subjects are envolved. Instructions for administration are provided in the mannual as well as record blanks.

In each item of this test, melodies are played on piano and are compared as to sameness on change in notation key or tempo.

Rhythem test is really a temp or abtility " to keep time."

In each items a particular beat is given and listener counts to himself at the same rate. Following the ceasation of the presented beat, listener continues to count until told to stop. He then writes the number he has reached at that point.

In form B of this test, a more difficult problem is presented, the subject being required to continue to count at the rate of original beat while distracting beat is presented.

Drake reports remarkably good validity using external criteria of " talent " which is defined in terms of expression in playing and rapidity in learning music.

The validity coefficients reported in the manual range from 31 to 91 with median coefficient of 59.

This is certainly better than those reported for other tests of this type.

The inter correlations between two Drake tests are low yet both correlate well with general criterion used for validation.

Drake suggests that these two factors along with pitch discrimination (which his test does not measure make up Musical aptitude.

JAMES MAINWARING comments on the test as follows :

"In musical memory tests the subjects hear two

bar melodies which they must recall for comparison with other melodies.

If new melody is the same as the first one. They put S in the appropriate answer book. The same melody in new key is indicated by K, a change in time by T and change in notes by N.

James Manwaring feels that though good practice examples are given on the record, some further illustration of " tranposition " and change in time would be desirable, since in tranposition, all notes are changed and change of time is not a change of tempo but rhythemic structure.

2 KWALWASSER Music talent test 1953

The test is prepared for children of grade 4 - 6 , 7 - 16 and adults.

There are two levels of the test and accordingly there are two forms of the test.

Form B is meant for children of grade 4-6

Form A is meant for grade 7 and over.

The main asset of the test is that whole test, takes only fifteen minutes' time.

Only three sets of norms are offered one form form B and two for form A. C Junior high school, senior high school respectively.

Form B presents forty (40) items each with three tones given and then repeated with either change in pitch, time, loudness or rhythem.

Form A is most difficult test built on the same plan having Fifty (50) items.

The items are presented in forced choice manner

in which the subject must determine, from between two possible variables given, whether a change has occured in pitch rhythem loudness, time.

Kwalwasser declares that training has little or no effect upon test scores.

He also rules out intelligence, sex as possible scores modifiers.

Kwalwasser presents no validity data of any sort.

It is assumed, however, that person with musical interest and training will score on published norms.

Kwalwasser claims that uninstructed child may be accurately tested for musical talent and that which is being tested is " an auditary potential and not influence of training.

Kate Hevner Mueller comments on the following test as follows.

"Kwalwasser's new test has an advantage of being short, requiring only ten to fifteen minutes to administer.

Loudness, pitch rhythem and time are the four variables.

Both the material and method used represent only tecnical improvement over seashore's original tests.

3 Musical Aptitude test by Harvey S whistler and L. Thorpe (1950) and under Caliphornia Test Berean.

The test is meant for children of grade four to ten.

The test is scored on 3 variables, namely Rhythem, (2) Pitch (3) Melody and the fourth score is the total score on the test.

Piono is essential for administration.
The purpose of this test is simple and straight forward i.e. " to measure an individual; aptitude for the study of Music."

Based on the assumption.

That the basic element of all Music are rhythem, Pitch and melody, the test sets out to measure the student's ability to recognize rhythem and pitch as utilized, in melodic patterns.

The extent to which the student comprehences these musical units is taken to reveal his aptitude or lade of aptitude for the study of Music.

The music stimuli aneplayed on piono.

The musical scores are provided in the mannual of instructions, but no tempo marking is indicated on musical score.

Accents are not marked in rhythem testing so chances of errors in paying, however can be made.

Players are told to repeat the item if they make a mistake in playing.

R. W. Lundin has suggested that if these tests are recorded on standard dises a regularity of presentation will be assured and consequently, reliability and validity would be improved.

The Kuder Richardson reliability coefficients reported are fair ranging from .64 for melody test to .87 for total score.

The validity coefficients for the total score are obtained from teacher's estimate of talents.

4. SEASHORE'S MEASURES OF MUSICAL TALENTS 1919-1956.

The test is prepared for children of grade four to sixteen (4-16) and adults.

The test scores are made on six areas w-hich C. Seashore thinks to be comprising of Musical talent They are (1) Pitch (2) loudness (3) time (4) timbre, (5) rhythem (6) tonal memory.

The test was originally constructed in the year 1919 and was revised in the year 1956 finally.

No adult norms are provided by Seashore.

The test consists of (1) sets of three twelve (12") inch records (78 rpm), (2) Scoring key (3) Mannual. The test constructed is by C. Seashore assisted by Don Lewis and Joseph G. Saetveit. Under the sponsorship of psychological corporation.

The six records are double faced, concerning six tests.

Basic assumption is that these six abilities mentioned above function in Music as they do in tests.

Seashore firmly believes that pitch discrimination, immediate memory and loudness discrimination abilities are easily identifiable and measurable.

Each item in the test consists in pairs of tones or tonal sequences. The subject indicates whether second tone is higher or lower than the first.

The items are progressively difficult by decreasing difference between tones of each pair.

(2) Loudness Test - Here the subject determines whether

the second (IInd) tone is louder, stronger or weaker than the first.

(3) Rhythem Test -

This test requires a comparison of rhythemic patterns that either same or different within each pair. It requires the comparison of rhythem patterns those are either same or different within each pair.

4. Time Test -

The subject records the second tone in each pair as longer or shorter.

5. Timbre Test -

It calls for discrimination of tonal quality; The tones are either same or different.

6. Tonal memory -

In this test, short series of three to five tones are played thrice in immediate succession. During second playing, one note is changed and the subject is to delect the changed note.

Grade norms which prepared on substencial population are available.

Retest reliability coefficients are a follows

series A	Pitch Test	- .79 - .88
	Loudness test	- .79 - .88
	Time Test	- .76 - .77
	Timbre Test	- .69 - .74
	Rhythem Test	- .62 - .73
	Tonal memory	- .80 - .84

Series B - Pitch - .78
loudness - .77
Time - .70
Timbre - .72
Rhythem - .72
Tonal memory - .39

W. Larson commends on the test as fallows. These tests, the first of their kind were presented to the public in record form as such it secure unique position in the history of musical aptitude testing.

Each measure appears in two forms of which one form is carier the meant for crude group work and another is a more difficult record dise meant for individual and accurate testing.

The source of stimuli for pitch, toudness and time was a beat frequency oscillator, for rhythem test, two oscillators, for tonal memory - a harmoned organ.

The differences in Timbre were effected by reciprocal alterations in the intensities of third and fourth harmonies of tones from a generator of the electrostatic type.

5. Wing's Standardized of Musical Intelligences 1939-58.

Wing believes that musical intelligence stays close to the skills involved in musical production and appreciation.

Like Seashore's Test mentioned above Wing was Phonograph recording in this test.

The test is designed for the children of age 8 on wards.

The test scores on seven areas mentioned below :
(1) Pitch change (2) chord analysis (3) Rhythem
(4) Anent(5)Harmoney(6)Intensity(7) Phrasing the
eight score is the total score on the test.

The test however requires 50 to 60 minutes time.

Piono music is used in each test and the first three test namely the test of (1) Pitch change (2) Chord analysis (3) Rhythem are the tests of sensory discrimination.

The test appears to be more comprehensive than Seashore's test.

6 ~~Lundin assumed~~

Lundin's Battery of Five Tests :

Lundin assumed that musical behaviours are interrelated.

He designed to items to differentiate musicians as well as unselected group of individuals on behaviour, which successful instrumentalist ~~vocalist~~, composers share such as writing melodies and harmonies correctly after they have been produced audibly, harmonizing single melody lines correctly following the rules set up old master's, ability to play and writerhythems correctly, ability to detect changes in sequential patterns.

The test includes measures of (1) Internal discrimination (2) Melodic transposition (3) Mode discrimination (4) melodis sequences (5) rhythemic sequences. Lundin's tests measure directly and objectively, some kinds of musical behavious which were not considered in previous investigations.

Whereas Seashore measured musical ability,

Lundin measured interrelated musical behaviour.

Some investigations have been done in Musical achievement (1947-54). ALPERIS designed a test to measure musical achivement in the areas - (1) Rhythem (2) harmony (3) melody . The test is tape recorded.

7. Gaston E Thayer designed a test to measure "Musicality" The test is recorded on twelve inch records.

A Comparative study of Aptitude tests in Music.

(1) Drake's musical Aptitude test.

Measure (1) Rhythem (3) Musical memory.

(2) Kwalwasser's Test of Musical talent

measures Pitch, time loudness rhythem.

(3) Harvey whistler's musical aptitude test

measures (1) Rhythem (2) Pitch (3) Melody.

(4) Seashore's Musical talent test measure.

(1) Pitch (2) loudness, time, timbre, Rhythem, tonal memory.

(5) Wings tests measure pitch change chord analysis Rhythem, Ascut, Harmony, Intensity Phrasing.

(6) Lunelin's test measures (1) internal discrimination (2) melodis transposition (3) mode discrimination, melodic sequence, rhythemic sequences.

(1) Salient common feature in all the tests is that Rhythem happens to be one of the areas to be measured in all test.

(2) Out of the size tests mentioned above, four test namely Kwalwassem's musical talent test (2) Harvey whistle's musical aptitude test (3) Seashore's musical talent test and wings tests measure ~~diffe~~ pitch as one

OF THE DIFFERENT AREAS? WHILE Drake's test and Seashore's test measure musical memory in common.

(2) Metronome for rhythem and piano for music are used in all the tests. Majority of the test mentioned about are either recorded on tape recorded.

(3) All the tests mentioned about measure for mostly the power of discrimination in different areas.

(4) All the tests mentioned above are designed for the children of eight yrs. and onward.

This, probably, discrimination power as well as musical aptitude become identifiable at the age of eight.

The investigator however feels that along with the power of discrimination of the power of comprehension as well as the power of correct reproduction play vital role in musical aptitude with this assumption in view, the investigator tried to design a musical aptitude test which is based on the power of discrimination (e.g. Pitch discrimination the different responses made on the rhythem test themselves envisage a power of discrimination)

(2) Accurate and correct responding to the different rhythem, different accents, in rhythem area as well as correct responding to the tones by accurate reproduction of the tones in tonal memory envisage power of comprehension as well as power of reproduction in addition to recall and recognition which are functions of memory. With those points in view, the investigator tried to design a musical aptitude test the items of which are widely to used by eminent music teachers for the purpose of detecting musical aptitude in the student, who on

being trained, is thought of as would be successful musician - vocal or instrumental.

R_E_F_E_R_E_N_C_E;

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CHAPTER : III

CONSTRUCTION OF TEST :

CONSTRUCTION OF MUSICAL APTITUDE TEST :

INTRODUCTION :

As has already been mentioned, the investigator aimed to measure

a) Rhythm Sense.

b) Pitch discrimination

and c) Tonal memory.

Which commonly are measured in the tests based on western music which ha ve been already described under chapter II.

Harmony and Melody are the two other factors measured by few tests based on western music.

The idea underlying Harmony which is the mainstay of western music is to produce an effect by means of more than two notes rendered simultaneously. This is done by means of chords of three or more selected notes played on one or more instruments. Thus in the system of Harmony the emphasis is on simultaneous combined effect of notes.

Rāga system is the unique and indispensible feature of Indian music and is an order developed and evolved from the principles of melody. Indian music tolerates no violation of the rules of rāgā consequently Harmony in which prohibited notes are bound to be produced.

When we consider melody we find the emphasis on effect of succession of notes and Indian music basically depends on the principles of melody.

The test to be designed should have included melody as another area to be measured but as it has already been mentioned that melody consists in succession of notes Ragas are different combination of seven notes and can be in thousands in numbers. How to detect few combinations of notes or ragas in order to detect the sence of melody ?

Besides, investigator feels that if a student is able to reproduce the tones presented to him correctly, he would be able, by practice, to master the permulations and combinations of seven notes.

Under the circumstances, the investigator preferred to select the three areas to be measured namely

a. Rhythm

b. Pitch discrimination

c. Tonal memory

Which happen to be the main areas of the musical aptitude tests based on western music. These areas happen to be the main areas in Indian musi as well. This has been discussed in the subsequent chapter.

The investigator aims to design a musical aptitude test which, while having the western as well as Indian music as basis, is objective, practicable, easily available, (western tests are not easily available) and simple in administration.

With this aim in view the investigator tried to select the items which have been detailed below.

SELECTION OF THE ITEMS :

In any kind of test construction, may it be an aptitude test or an achievement test, number of items have to be decided upon and thereafter they are " Tried out ". Then only, by method of item analysis, the items to be included in the final test a-re selected. But due to limitation of time as well as finances, the investigator planned to include only such items which are tried out already by musicians when they talk a short test before selecting a student for music training.

The investigator interviewed number of musicians (instrumental as well as vocal), music teachers having commendable status and success in the musical field. During interview they were requested to let the investigator know about what they thought to be essential for a student having musical aptitude. On the basis of the information gathered through the interview, the investigator devised a questionnaire inviting comments as well as suggestions for the items to be decided upon for the musical aptitude test.

The questionnaire forms were sent to different musicians, music teachers and lovers of music.

The following are the areas and corresponding items which were suggested as commonly used and desirable for the test.

1. RHYTHM SENSE

a) Rhythm equality sense ([illegible])

Item suggested for this sense.

" Ask the student to give clap ([illegible]) on

every fourth number. Thereby breaking the rhythm into parts, each part consisting of four mātrās and judge the continuity and consistency of rythm in each part thus broken."

b) Ability to pickup rythm (लय ग्रहण करने की क्षमता

Item suggested for this sense.

(i) " Play 'TEENTAL' on Tabla in मध्य लय

Ask student to give clap on every fourth mātrā. Play two items (धुन) on the Tabla and ask the student to continue giving clap on every fourth mātrā."

(ii) Ask the student to singa simple song. Play a different layā on the Tabla and ask the student to sing the song in the layā in which the Tabla is being played. Let the tabla be continued.

(iii) Ask the student to play धुन while giving clap in the same layā of which the धुन is to be made.

2. ABILITY TO PRACTICE FOR A PROLONGED TIME

(अभ्यास करने की क्षमता)

No item has been suggested for such ability.

3. PITCH SENSE :

(i) Quality of voice - Item suggested -

" Judge the voice of the student by asking him to sing "

The voice is good if it has consistency, melody and volume and continuity.

(ii) Pitch discrimination :

Item suggested -

" Sing two different Swarās and ask the student

to judge the second swara, whether high or low or sing the same swaras twice and ask the student to judge whether it is high or low or same."

(iii) " ~~Ask the~~

Pitch range - Item suggested

" Ask the student to sing the lowest swar and thereafter to raise the pitch gradually till the maximum pitch beyond which he can not sing.

(iv) Correct reproduction of Swaras (Soundreading)

" Sing different swaras one by one and ask the student to reproduce the same swaras one by one.

(v) Tonal Memory - Item suggested

" Sing four to six different swaras in ascending order and ask the student to reproduce the same swaras.

(vii) Musical performance :

Item suggested " Ask the student to sing a song of his choice. Judge the general appeal, melody, rhythm.

On the basis of the items suggested as above and under the valued guidance of M.K. DR. P.N. CHINCHORE, Ex. Vice Chancellor Indira Kala Visshwavidyalaya Khairagarh and presently the Principal Music College Indore, the investigator selected the items mentioned below with slight modification and alterations with a view to make the items novel, interesting and objective.

RHYTHM TEST :

Rhythm is the master area in musical field.

Rhythm is just like a plastic piece which can be moulded into numerous patterns, altered and remoulded as occasions demand. For its' better appreciation we

need to sense a skeleton a relatively unvarying constant a static foundation which we call time (ताल). Thus there is a close relationship between rhythm (लय) and time (ताल) but then, time, though a bit unvarying in nature happens to be flexible unless controlled by the ticks of the clock or beats of metronome.

According to CHARLES HOOPER (1946), it is best to use METRONOME as guide.

The essence of rhythmic experience is sense of grouping and clothing the beats in patterns (ताल) He further states that at early stage this grouping should be confined to two or three beats.

In Hindusthani music, rhythm is supposed to be of three kinds.

a) Vilambit láyá (slow)

b) Madhya Láyá (MEDIUM)

c) Drut láyá (FAST)

Consequently it follows that any rhythms was fixed as thirty (30) beats of metronome per minute (slow or vilambit); Sixty (60) beats of metronome per minute (medium or madhya laya) and ninty (90) beats per minute (fast or Drut laya) after demonstration of the aforesaid rates on metronome before few musicians and after getting confirmation about the correctness of the rate of rhythm.

To test the sense of change in accents it was suggested that the student may first be given demonstration of playing ' TEENTAL '; 'ZAPTAL' and 'EKTAL' on hands and thereafter he may be asked to play the Talas (by clapping) e.g. TEENTAL consists of sixteen beats or matras and a clap is given on every first beat in a

group of four matras.

Similarly in the EKTAL which consists of twelve matras, on every first matra in a group of two matras, a clap is given.

ZAPTAL is a bit difficult tal consisting of ten matras and the clap is given on first, third, sixth and eighth matra in a group of ten matras.

To sum up, items suggested for the rhythm test were meant to test the rhythm ( ) sense, time sense and comprehension but them majority of the items suggested, though important, were subjective and slightly monotonous. The task before the investigator was to make the items novel, interesting and objective. The objective was not only measuring the sense of different rhythms but measuring the comprehension of different rhythms. With this view the following items were devised by the investigator.

T . RHYTHM TEST A a.

To judge the sense and comprehension of low rhythm the investigator requires to play metronome firstly at the rate of thirty beats ~~were made to stop~~ per minute for 45 seconds. The metronome beats were made to stop and after ten seconds the student is asked to counter numbers at the rate to which he was exposed before. The counting of numbers, is done for the five minute and the student is asked to stop counting the numbers and write the last number counted before the column of Rhythem test A a.

Instructions to start counting as well as to stop

corenting is given through ringing of a bell.

2. RHYTHM TEST A b.

To measure the sense as well as the comprehension of the medium rhythm (মধ্য লয়), metronome at the rate of 60 beats per minute is to be played before the student for 30 reconds. Ten seconds thereafter the student is asked to count the number at the rate at which metronome has just been played. The student is asked to count the numbers for the whole minute and after the time is over he is asked to write the last number counted before Rhythm test Ab column.

3. RHYTHM TEST Ac :

To measure the sense as well as comprehension of the test rhythm, metronome at the rate of 90 beats is played before the student for 35 seconds. Ten seconds thereafter the student is to be asked to count numbers at the same rate at which metronome has just been played. For full minute counting is continued and after the full minute is over the subject is asked to write the last number counted before the Rhythm Test Ac column.

Thus in short, rhythm test A is devised to measure the comprehension of the three standard Kinds of Rhythm.

II RHYTHM TEST B is mainly devised to measure not only the দুগুন or doubling sense of rhythm but to comprehend the sense of time (লয় জ্ঞান) . The main contention behind this is that in order to give an impressive recital, quite often the artist sings or plays in 'Dugun' (two times the rhythm). The chougun (four times the rhythm) Dedhagun (One and half times) etc. The simplest form

consists in playing in dugun. As such, would be musician must have atleast the dugun sense. Secondly the rhythm test B is designed to measure the tal sense. With these objective the test items are devised as follows. ~~the test~~ Novel procedure is adopted in this test in order to avoid monotory.

RHYTHM TEST B a is devised to test the dugun or doubling sense of the rhythm along with talsense ( ). At first metronome is played at the ra-te of 60 beats per minute for sometime and thereafter the subject is asked to count rumber as " one - Two; one - Two "at the rate which is double the rate at which metronome. Continues to play .

The subject is asked to count number at double the rate at which metronome continues to play and at the sametime while counting, he is asked to mark tally (mark) on every first number in a group of two numbers. The task here is threefold. Firstly to count the numbers in " one - two; One - Two fashion, secondly to count the number at double the rate and thirdly to mark tallies while counting on every alternate number.

In the Rhythem test Ba the metronome is continued to be played while counting continues. The contention behind this is that Rhythm test Ba does not intend to measure the consistency of the rhythm as much as it is intended to measure the sense of doubling of rhythm.

Normally it is a practice to measure this sense by asking the student to double the rhythm and the teacher continues to give clapping (Tali) in the medium rhythm. But then this practice is firstly too subjective in the

sense that there are chances that the rate of rhythm which is to be doubled might become faster and faster. Metronome beats are more steady.

Secondly to test this rhythm sense a person testing the student must have adequate training and practice in music. But an aptitude test should be such that it can be administered by any person whether he has musical training or not.

RHYTHM TEST Bb.

In order to study the doubling of rhythm sense and that too in a different grouping of beats, a novel method is designed which would enable us to detect not only a [illegible] but which is objective and novel too.

In this test, metronome at first is played at the rate of 60 beats per minute ([illegible]) thereafter the subject is asked to count the numbers as " one Two, one Two three, one two, one two three " and that too at the rate which is double the rate at which metronome is played. The grouping of the beats " one two - one two three" resembles the Zaptal in Hindusthani music. Zaptal consists of ten mātrās with accent on 1st, 3rd, 6th, 8th beats in a group of ten mātrās or beats.

Here too, as in rhythm test Ba the task is three fold.

The subject is to count numbers at the double rate.

Secondly the subject is to count number in " one Two - one two three " fashion.

Thirdly the subject while counting numbers is to mark Tally (mark) when he counts the first number in 5 numbers

i.e. in counting " one two - one two three" he has to mark tally one the first counting of"one number".

RHYTHM TEST Ca and Cb, both are tests of distraction the investigator intends to study through these test the consistency of rhythem sense.

In the rhythem test Ca and Cb the counting procedure as well as the rate of counting are similar to the rhythm test Aa Ab and Ac i.e. students are asked to count the numbers in a plain fashion, the rate is the same. The differentiating element here is that at first metronome is played at the rate of 60 beats per minute for sometime whereafter metronome is stopped. After to seconds the student is asked to count numbers but this time while counting is in process, metronome is played at the rate of 30 beats per minute and the student is asked not to take cognisance of the rate of the metronome which is being played during counting process. Thus the medium laya is interpolated by slow rhythm and after full one minute is over the subject is asked to write the last number counted before test Ca.

During I vocal or instrumental recital (when both these recitals are accompanied to Tabla) quite often the tabla player in his mood of playing rhythemic acrobats e.g. playing dhgun, chougun (four times), athgun (eight times) looses the original rhythm and gradually increases the original rhythm. So also the vocal or instrumental artist plays music in the different rhythms (लयकारी) and alters two or three overs of the ताल , catch the सम (beging beat of the Tal). We enjoy this wonderful rhythm feet not only in classical music but in film music too.

However it is obligatory on the artist to be consistant with his rhythm irrespective of the distraction, difference in the rate of rhythm. The appeal of the different types of music is to some extent decided by the rhythm e.g. khayals are sung in the Vilambit laya becomes faster, and loose their charm or impact if the laya becomes faster.

Similarly devotional songs (Bhajans), Chhota Khayals are sung in madhyam laya (Medium rhythm) and become least appealing if sung in vilambit or drut laya.

Specifically when Bhajan or Chhota Khayak is later on sung in the drut laya (the laya becomes drut either due to lack of consistency on the part of the singer.

Thus the power to control such increase or decrease in basic laya in necessary.

Test Cb is virtually the repeatition of rhythem test Ca that is to say the metronome is played at first at the rate of 60 beats per minute whereafter the subject is asked to count numbers but this time the medium laya is interpolated by fast or drutlaya.

The subject is asked not to take cognisance of the rhythm which is played during counting. After full one minute, counting is stopped and the subject is asked to write the last number counted before the test Cb column.

Many more test items have been suggested but they are more or less repeatition of those mentioned above and thus finally the investigator decided to have only seven rhythm subtest mentioned above.

PITCH AREA :

As mentioned above four items have been suggested namely item detecting the quality of voice pitch range, consistency and continuity of voice pitch discrimination.

The first three items have not been considered, while designing the test because the judging of the quality of voice is subjective. There can be no accurately measuring device which would measure the good quality of voice. Besides the quality of voice can be raised by practice even to great extent. Secondly the quality of voice is least important instrumental music. The investigator intends to measure musical aptitude for vocal as well as instrumental music. So is the case with pitch range, consistency and continuity of voice.

The investigator feels that in pitch area minimum power to be detected is the power of pitch discrimination by which subject is able to detect the difference or the sameness of the pitch.

In this test ten combinations of two Swaras each is presented before the students. One by one the student is to detect where second Swara in each combination is higher, lower or the same. A straight line is drawn before the column of pitch discrimination test and the subject is to mark 'X' after hearing the two swaras. If he feels that the second swara is higher than the first he may mark 'X' above the line; if he feels the second swara as lower than the first he may mark 'X' below the line while if he feels that the second swara is the same as first he may mark 'X' on the line.

TONAL MEMORY :

Tonal memory implies the correct reproduction of swaras, the normal span of memory being 6 digits or words as the case be. On this basis the investigators under the guidance of Dr. P.N. Chinchore, selected swaras in Raga Bilawal and the maximum length of the swaras was fixed at six at a time. Raga Bilawal consists of all the seven swaras which a re " shuddha " in nature this being the simplest swara that can be easily reproduced.

1 In the subtest number one the following swaras are produced on harmonium (may be sung)

a. सा , ग , रे , ध म

b. ग , प म ध प गं

and the students are asked to reproduce the swaras heard.

2 In thhs subtest the swaras are 'shhuddha and simple. They are as follows.

a. सा ग सा ग सारे गम प

b. मग रेसा गरे सारे सा सा सा.

These swaras are produced on harmonium and thereafter the students are asked to reproduce the swaras.

3. This subtest includes the following combination of swaras to be produced on harmonium and thare-after those swaras are to be reproduced by the students.

सारे मग प प प प ध ग रे

सारे सा_ रेग रे सा_ सा धप प

Tonal memory test measures not only the power of correct reproduction and memory for the swara but measures the power of reproducing the swaras in double rhythm too.

Many times, in a song, the artist has to change the rhythm for few words or for few beats (in instrumental music) which is usually in double rhythm or vice versa. Thus in short the tonal memory test, tests the rhythm sense in reproducing the tunes (swaras).

To sum up three main areas were selected for the musical aptitude test - namely - Rhythm, pitch discrimination and Tonal memory.

Seven subtests are designed to measure the rhythm sense, one test consisting of ten combinations of two swaras, each is designed to measure pitch discrimination and six subtests are designed to measure tonal memory.

The detailed design of the test is appended.

The investigator feels that it would be desirable if the whole test is tape recorded and then administered. The test thus constructed can partly be administered to a group of maximum ten students. Rhythm test and pitch discrimination test, both can be administered to a group of ten students at an time but tonal memory is a individual test in which the administering person has to judge the reproduction of swaras as correct or incorrect.

Besides some students may feel shy to sing or reproduce the swaras in the presence of others.

Here too in tonal memory test, the person administering the test may not have sufficient knowledge of music but he should be able to judge the matching of the swaras produced and the swaras reproduced.

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CHAPTER : IV

ADMINISTRATION AND SCORING :

ADMINISTRATION AND SCORING :

NUMBER OF SAMPLES

76 (Seventy Six)

MATERIALS USED

1. TAPE RECORDER — The full Test was recorded.
2. METRONOME — For the purpose of display.
3. INSTRUCTION SHEETS
4. ANSWER SHEETS.

(The test was administered to a group of five students at a time.)

PRECAUTIONS :

1. In order to partial out the effect of musical training and background, only those students were administered the test who had absolutely no background or training in music.

2. The investigator, after being fully convinced that good rapport has been established and students are willing to give the test, administered the test.

PROCEDURE :

To a group of five students the investigator firstly narrated the purpose of administering the test. She fully convinced each and every student that in any case the test was not meant for purpose of measuring intelligence but it was only for assessing the musical aptitude in the student.

She also promised the students that after scoring and analysis of the test results, she would let the students know about their scores on the musical aptitude test if they wish so. At least those students who score high on the musical aptitude test, would be informed.

The investigator destributed the answer sheets along with instruction sheets (cyclostyled in Hindi) and introduced metronome and its working. The students were pleased to observe the working of the metronome.

The investigator, thereafter, asked the students to read the instructions for test Aa only. These instructions were also recorded on tape. After a demonstration of how to count numbers on hearing the rhythm, the students were personally asked to be attentive.

RHYTHM TEST Aa :

Metronome, at the rate of thirty beats per minute was played for fortyfive seconds. After ten seconds, as per instructions, students started counting numbers for the whole minute.(they were asked to start counting numbers at the rate at which the metronome was played immediately on hearing the ring of the bell (Ring of bell was also recorded on tape) and they were instructed to stop counting immediately after hearing the subsequenting ring of the bell which was also recorded on tape.

The students, thereafter, wrote down the last number counted against the Rhythm Test Aa column.

Metronome, at the ra-te of 60 beats per minute, was played for 15 seconds and on hearing the ring of the bell the students started counting numbers in 'one - Te, one - two ' fashion and marked the tallies on every first number in the two numbers as per instructions. They counted the numbers one-two, one-two at double the rate at which metronome beats were continued. The students stopped counting and marking tallies on hearing the ring of the bell. (counting of the tallies was done subsequently by the investigator).

RHYTHM TEST Bb.

The students were advised to read the instructions given for the rhythm test Bb. The instructions were repeated through the taperecorder also.(practice exercise was given).

Metronome at the rate of 60 beats per minute was played for 10 seconds. Ten seconds thereafter, immediately on hearing the ring of the bell, students started counting numbers at double the rate at which metronome continued to be played while marking tallies against the column of rhythm test Bb. The students, as per instructions, marked tallies after counting every first number in a group of five. After the full minute was over the counting was stopped.

RHYTHM TEST Ca.

The students were advised to read the instructions ~~were given~~ carefully. The instructions were given through the tape-recorder also.

(Test Ca and Cb, both are devised to measure the effect of interpolation of the different rhythms in the basic rhythm).

RHYTHM TEST Ab.

The students were asked to read the instructions for the test Ab, the instructions through tape recorder were also given.

Metronome, at the rate of 60 beats per minute, was played for 30 seconds. After ten seconds, the students started counting numbers for the whole minute and they stopped counting the number immediately on hearing the ring of the bell. The students wrote the last number counted against the column Rhythm Test Ab.

RHYTHM TEST Ac.

The students were asked to read the instructions for Rhythm Test Ac given in the instruction sheet. These instructions were also given on tape recorde.

Metronome, at the rate of 90 beats per minute, was played for 35 seconds. After Ten seconds, on hearing the ring of the bell, the students started counting the numbers at the rate just displayed for the whole minute and on hearing again the ring of the bell they stopped counting and wrote down the last count before the column of Rhythm Test Ac.

RHYTHM TEST Ba.

The students were asked to read the instructions given in the instruction sheet for rhythm test Ba. The instructions were repeated through tape record.

The investigator demonstrated to the students the way to count and mark tallies.

They were also informed to be very attentive this time since the procedure for counting and writing was different from the earlier ones.

DEMONSTRATION WAS GIVEN :

Metronome was played for 45 seconds at the rate of 60 beats per minute. Thereafter (after ten seconds) the students started counting members without paying any attention to the rate of beats which was played on metronome while the counting was continued. The rate during the counting period was 30 beats per minute, with a view to observe effect of slow rhythm over the medium rhythm. After full one minute, the students on hearing the ring of the bell, stopped counting the numbers and wrote down the last number thus counted, against the column of rhythm test Ca.

RHYTHM TEST Cb.

The students were advised to read the instructions given in the instruction sheet for the test Cb.

Metronome was played at the rate of 60 beats

counting the number ~~to~~ least caring for the rate at which the metronome was being played during this period. After one minute when there was nother ring of the bell the students stopped counting and wrote the last number thus counted against the column ~~of~~ of rhythm test Cb.

PITCH DISCRIMINATION :

The students were given instructions through tape-recorder.

The students were given demonstration as to how to respond to the swaras and how to mark the position of the second swara on above or below the line.

1. First group of swaras was swara षा and प The swara षा was played for five seconds (whole test was recorded on a tape recorder). After five seconds the swara प (pamhom) was played. Students were asked to mark the second swara पंचम on, above or below the line according to their comprehension of that swara as same, higher than or below the first.

2. Second group of swara was षभ and षा swara मध्यम . Firstly swara षा was played for five seconds. After a gap of five seconds swara मध्यम was played for five seconds.

The students, on hearing the second swara मध्यम marked its position on, above or below the line with respect to swara षा .

3. Third group of swaras was षा and निषाद मंद्र षड्ज (one swara below the swara षा .)

Swara षा was played for five seconds and after a gap of five seconds swara निषाद was played for five seconds. The students on hearing the swara निषाद marked its position according to their comprehension with respect to the first swara षा .

4. The fourth group of swaras was swara षा and " षा and गंधार ." swara षा was played for five seconds and after a gap of five seconds the swar गंधार was played for five seconds. Immediately on hearing the swara गंधार thestudents marked its position in respect with the swara षा according to their comprehension.

5. The fifth group of the swaras was the group of swaras षा and धैवत (धैवत is the swara

of पंचम स्वरान्तर , two swaras below the swar पं) firstly the swara पं was played for five ~~seconds~~ seconds and after a gap of five seconds the swar was played and students were asked mark its position with respect to swara पं .

In this section of the test in every group one swara namely the swara पं was kept as constant.

The second section of the pitch discrimination test was a bit difficult. Here the distance between the two swaras was minimum.

1. Firstly a group of swaras रे and रे was presented. Firstly swar रे was played for five seconds and after a gap of five seconds ~~swar~~ रे and ~~was played~~ (komala Rikhabh) which is one swar below the swar रे was played for five seconds. The students were asked to mark the position of the second swara (रे) according to their comprehension.

2. A group of swaras ग ग was played firstly swar ग was played for five seconds and after a gap of five seconds swar ग (तीव्र स्वरान्तर - one swara higher than the first) was played for five seconds. The students were asked to mark the position of second swara with respec to first one.

3. The third group was a group of swaras ध - ध firstly swar ध was played for five seconds and after a gap of five seconds swar ध (कोमल स्वरान्तर one swar below the swar ध) was played for five seconds. The students marked the position of the second swar in respect to the ~~last~~ one first one.

4. Fourth group was a group of swar ध

(both these swaras are swaras of मन्द सप्तक (low pitch range).

Firstly swar नि (कोमल निषाद) was played for five seconds. After a gap of five seconds the second swar रे was played for five seconds. The students marked the position of the second swara रे with respect to the first swar रे नि according to their comprehension.

5. Fifth group was a group of two swaras ग - ग

Firstly the swar ग (komal gandhar) was played for five seconds and after a gap of five seconds the swar ग was played for five seconds. The students marked the position of ग with respect to the first swar they heard (ग)

The whole procedure was repeated in fifteen groups.

TONAL MEMORY :

This test was taken individually

The students were given the following instructions.

" आप लोगों के सामने कुछ स्वर समुदाय गाये जायेंगे । आप उन्हें सुनकर कृपया वही - वही गाकर बताईये । "

They were asked to reproduce the group of swaras which they would hear.

First group of Swaras.

(Individual student was asked to reproduce).

1. सा , ग , रे , म , ग
2. प , म , ध , प , नी , प , सा
3. सा , ग , सा , ग , सारे , ग्म प
4. सग रेसा सारे सासे सा सा सा

5. सारे गम प ध प ध प ग रे

6. सारे सा रेग मे पध प धप ध

Note : After the presentation of each group of swaras the individual tried to reproduce the swaras just heard.

The investigator noted down the number of correctly reproduced swaras.

SCORING :

RHYTHM TEST

RHYTHM TEST Aa :

Here the students noted down the last number counted. The answers of the test can not be said to be right or wrong eg. The exa-ct answer to this test was thirty. But the students who wrote the last counted number as 28 or 35 can not be called wrong or scored as 0.

The scoring can be based on the deviations of the answer from the correct answer. If the correct answer is thirty (30) and if a student gives the answer as forty (40) the deviation would be ten (10). On the other hand if he proceeds at a slow speed and gives the answer as twenty (20) his deviation from the correct answer is also ten (10). The scoring therefore should be based on the amount of deviation (error) from the correct answer. The greater error to the deviation the less will be the score. No discrimination has been made between error on the positive side that is counting more than the correct answer or error on the negative side that is

Counting less than the correct answer.

The Q3 i.e. 75 percentile score, the median point score and Q1 i.e. 25th percentile scores were calculated after arranging the scores into frequency distribution. The following is the frequency of distribution of the data of scores on the rhythm test Aa.

Frequency distribution of scores on test Aa

Class intervals.	Frequencies
24 - 26	1
21 - 23	0
18 - 20	2
15 - 17	6
12 - 14	10
9 - 11	12
6 - 8	21
3 - 5	11
0 - 2	-

$$Q3 = L + \frac{(3N/4 - fcum)}{f} I$$

$$= 8.5 + \frac{(57 - 45)}{12} 3$$

$$= 8.5 + \frac{12}{12} \times 3$$

$$= 8.5 + 3 = 11.5$$

$$Q1 = L + \frac{(N/4 - fcum)}{f} I$$

$$= 2.5 + \frac{(19 - 13)}{11} 3$$

$$= 2.5 + \frac{6}{11} \times 3$$

$$= 2.5 + 1.63 = 4.13$$

$$\text{Median} = L + \left(\frac{N/2 - f_{cum}}{f}\right) I$$

$$= 5.5 + \left(\frac{38 - 24}{21}\right) 3$$

$$= 5.5 + 2 = 7.5$$

The score values of Q3 = 11.5, median = 4.13 and Q1 = 4.13

The exact score for this test was 30 so deviation from the score 30 were taken and on the basis of deviation and the Q3, median and Q1 score values, the marks were given as follows -

Deviation score range	Marks alloted.
0 - 5	3
6 - 8	2
9 - 12	1
Above 12	0

RHYTHM TEST Ab.

As in case of rhythm test Aa here also the answers given by the student can not be categorised as wrong or right hence the same procedure was followed.

The following is the frequency distribution arranged out of the deviations from actual answers obtained by the students on the rhythm test Ab.

Class intervals.	frequencies.
24 - 26	1
21 - 23	1
18 - 20	2

15 - 17	6
12 - 14	3
9 - 11	5
6 - 8	14
3 - 5	17
0 - 2	27

$$Q3 = L + \frac{(3N/4 - fcum)}{f} I$$

$$= 5.5 + \frac{57 - 44}{14} \times 3$$

$$= 5.5 + \frac{39}{14}$$

$$= 5.5 + 2.78 = 8.28$$

$$\text{Medium} = L + \frac{(N/2 - fcum)}{f} \times I$$

$$= 2.5 + \frac{(38 - 27)}{17} 3$$

$$= 2.5 + \frac{33}{17}$$

$$= 2.5 + 1.94 = 4.44$$

$$Q1 = L + \frac{(N/4 - fcum)}{f} \times I$$

$$= 0 + \frac{19 - 0}{27} \times 3$$

$$= 0 + \frac{57}{27} = 2.11$$

On the basis of the Q3, medium and Q1 scores values, the following to the distribution chart of scores alloted to the students.

Deviation ranges	alloted.
0 - 2	
3 - 5	
6 - 9	
Above 9	

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RHYTHM TEST A6

The procedure is the same that is to say deviations from exact answers are taken, Q3, median and Q1 values are obtained and scores are alloted on the basis of those values.

The following is the frequency distribution of scores arranged.

Class intervals	frequencies.
45 - 47	1
42 - 44	0
39 - 41	1
36 - 38	0
33 - 35	-
30 - 32	2
27 - 29	3
24 - 26	0
21 - 23	2
18 - 20	1
15 - 17	1
12 - 14	3
9 - 11	5
6 - 8	15
3 - 5	27
0 - 2	14

$$Q3 = L + \left(\frac{3N/4 - fcum}{f}\right) I$$

$$= 8.3 + \frac{57 - 52}{5}\ 3$$

$$= 8.5 + \frac{3}{5}$$

$$= 8.5 + 0.6 + 9.1$$

$$\text{Median} = L + \frac{N/2 - fcum}{f}\ I$$

$$= 2.5 + \frac{(33 - 14)}{27} 3$$

$$= 2.5 + 2.66 = 5.16$$

$$Q1 = L + \frac{(N/4 - fcum)}{f} I$$

$$= L + \frac{(19-14)}{27} 3$$

$$= 2.5 + \frac{15}{27}$$

$$= 2.5 + 0.55 = 3.05$$

The following is the table for the deviation scores based on the Q3, median and Q1 score values.

Deviation range	scores
0 - 3	3
4 - 6	2
7 - 9	1
a bove 9	0

RHYTHM TEST Ba.

The following is the frequency distribution of the raw scores made on the test Ba.

Class intervals	frequencies.
36 - 38	1
33 - 35	1
30 - 32	0
27 - 29	0
24 - 26	5
21 - 23	1
18 - 20	5
15 - 17	3
12 - 14	5
9 - 11	11
6 - 8	3

3 - 5	11
0 - 2	26

$$Q3 = L + \frac{(3N/4 - fcum)I}{f}$$

$$= 11.5 + \frac{(57 - 55)3}{5}$$

$$= 11.5 + 1.2$$

$$= 12.7$$

$$Median = L + \frac{(2N/4 - fcum)I}{f}$$

$$= 5.5 + \frac{(38 - 37)3}{7}$$

$$= 5.5 + 0.428$$

$$= 5.928$$

$$Q1 = L + \frac{(N/4 - fcum)I}{f}$$

$$= 0 + \frac{(19 - 0)3}{}$$

$$= 0 + 2.19$$

$$= 2.19$$

The following is the table of scores on the basis of Q3, median and Q1 values.

Deviation range	scores.
0 - 2	3
3 - 6	2
7 - 13	1
Above 13	0

RHYTHM TEST Bb.

The following is the frequency distribution of the raw scores made on the test Bb

Class intervals	frequencies
42 - 44	1
39 - 41	0
36 - 38	1

33 - 35	1
30 - 32	1
27 - 29	1
24 - 26	2
21 - 23	5
18 - 20	6
15 - 17	7
12 - 14	8
9 - 11	7
6 - 8	16
3 - 5	9
0 - 2	12

$$Q3 = L + \left(\frac{3N/4 - fcum}{f}\right)I$$

$$= 14.5 + \left(\frac{57 - 52}{7}\right)3$$

$$= 14.5 + \frac{15}{7}$$

$$= 14.5 + 2.14$$

$$= 16.64$$

$$\text{Median} = L + \left(\frac{N/2 - fcum}{f}\right)I$$

$$= 8.5 + \left(\frac{38 - 37}{7}\right)3$$

$$= 8.5 + \frac{3}{7}$$

$$= 8.5 + 0.428$$

$$= 8.928$$

$$Q1 = L + \left(\frac{N/4 - fcum}{f}\right)I$$

$$= 4.5 + \left(\frac{219 - 12}{9}\right)3$$

$$= 4.5 + 2.33$$

$$= 6.83$$

On the basis of the Q3, median and Q1 values the following is the table for the scores alloted on the rhythm test Bb.'

Deviation range	scores
0 - 7	3
8 - 10	2
11 - 17	1
Above 17	0

RHYTHM TEST Ca.'

Frequency distribution on the basis of devications taken from the actual answers.'

Class intervals	frequencies
27 - 29	2
24 - 26	1
21 - 23	0
18 - 20	2
15 - 17	9
12 - 14	9
9 - 11	7
6 - 8	14
3 - 5	18
0 - 2	14

$$Q3 = L + \left(\frac{3N/4 - fcum}{f}\right) I$$

$$= 11.5 + \left(\frac{57 - 53}{9}\right) 3$$

$$= 11.5 + 1.33$$

$$= 12.83$$

Median

$$= L + \left(\frac{N/2 - fcum}{f}\right) I$$

$$= 5.5 + \left(\frac{38 - 32}{14}\right)3$$

$$= 5.5 + 1.28$$

$$= 6.78$$

$$Q1 = L + \left(\frac{N/4 - \text{form}}{f}\right)I$$

$$= 2.5 + \left(\frac{19 - 14}{15}\right)3$$

$$= 2.5 + 0.83$$

$$= 3.33$$

On the basis of the deviation range based upon Q3, median and Q1 the following is the table of scores alloted.

Deviation range	scores
0 - 3	3
4 - 7	2
8 -13	1
Above - 13	0

RHYTHM TEST Cb :

Frequency distribution of deviations from actual answers.

Class intervals	frequency
27 - 29	1
24 - 26	1
21 - 23	0
18 - 20	1
15 - 17	4
12 - 14	27
9 - 11	13
6 - 8	11
3 - 5	7
0 - 2	11

$$Q3 = L + \left(\frac{3N/4 - fcum}{f}\right)I$$

$$= 11.5 + \left(\frac{52 - 42}{27}\right)3$$

$$= 11.5 + 1.33$$

$$= 12.33$$

$$\text{Median} = L + \left(\frac{N/2 - fcum}{f}\right)I$$

$$= 8.5 + \left(\frac{38 - 22}{13}\right)3$$

$$= 8.5 + 2.07$$

$$= \text{Q} \quad 10.57$$

$$Q1 = L + \left(\frac{N/4 - fcum}{f}\right)I$$

$$= 5.5 + \left(\frac{12 - 10}{1}\right)3$$

$$= 5.5 + \frac{3}{11}$$

$$= 5.5 + .27 = 5.77$$

On the basis of the Q3, median and Q1 values the following is the table of scores alloted.

Deviation Range	Scores
0 - 6	3
7 - 11	2
12 - 13	1
Above 13	0

PITCH DISCRIMINATION

In this test scoring procedure was simple. In all ten pairs of tones were presented and one mark was alloted be each pair. This in all ten marks were alloted to pitch discrimination Test.

TONAL MEMORY :

The procedure of scoring in this test w as also simple.

In all there are eight series of tones presented to the students. The following are the number of swaras in each series of swaras presented.

1 Five Swaras

2 Seven Swaras

3 Eight Swaras

4 Eight Swaras

5 Ten Swaras

6 Eight Swaras

Thus in all forty six swaras were presented. Half a mark was alloted to each score. The total score on tonal memory thus is twenty three.

The table of maximum marks to the various items in the musical aptitude Test.

Rhythm Test		Pitch discrimination.	Tonal memory.
Aa	3	10	1 - 2½
Ab	3		2 - 2½
Ac	3		3 - 4
Ba	3		4 - 4
Bb	3		5 - 5
Ca	3		6 - 4
Cb	3		
Total	21		Total 23

The total score (maximum) is fifty four

(21 + 10 + 23 = 54)

CHAPTER : XV

ANALYSIS , INTERPRETATION AND SUGGESTIONS :

ANALYSIS AND INTERPRETATION OF MUSICAL APTITUDE TEST SCORES :

The quality of tests has improved over the past two or three decades.

Millions of tests are being used to-day in schools. But then the interpretation and analysis of test score is of pivotol importance before the results of the test are used as either predictors or diagnosees.

CRONBACK and GLESER suggest two district meanings of test interpretation.

According to them, firstly, we need to understand test score. Here the emphasis is on personal understanding of the scores. Secondly, according to them, we must interprete the test scores to someone else. Herealso interpretation required through understanding of the test scores plus the ability to communicate the results.

In order to understand the test scores various devices are generally used amongst which mean, median, mode, standard deviation, T scores are the main devices

The scoring scheme has already been detailed out in the previous chapter.

In this chapter, in order to understand thoroughly the test scores MEAN, MEDIAN, MODE (measures of central tendency of the distribution), STANDARD DEVIATION; T SCORES (in order to plot T distribution); PERCENTILE SCORES, NORMS on five point scale,

SIGNIFICANCE of difference between the two age groups, RELIABILITY COEFFICIENT, VALIDITY COEFFICIENT are calculated. The detailed account of these devices along with their interpretation is given herewith.

As has already been mentioned one musical aptitude test scores have been tabulated in a frequency distribution as follows :

class intervals	f	x^1	fx^1	fx^2
41 - 45	6	+3	+18	54
36 - 40	10	+2	+20	40
31 - 35	9	+1	+9	9
26 - 30	14	0	0	0
21 - 25	14	-1	- 14	14
16 - 20	11	-2	-22	44
11 - 15	9	-3	-27	81
6 - 10	3	-4	-12	48

CALCULATION OF MEAN :

Mean is a measure of central tendency. It is the most common measure of position and of central tendency of the distribution. It is most characteristic or typical of a set of scores.

$$\text{Mean} = AM + CI$$
$$= AM + \left(\frac{\Sigma fx^1}{N}\right) I$$
$$= 25 + \left(\frac{-28}{76}\right) 5 = 23 + \left(-\frac{140}{76}\right)$$
$$= 23 - 1.84$$
$$= 26.16$$

Central tendency indicates the score where exactly fifty percent of cases lie. The median is often

FREQUENCY POLYGON
FREQUENCY
14
12
10
8
6
4
6
10
15
20
25
30
35
40
45
50
CLASS INTERVALS (SCORES)

used when the distribution is skewed.

CALCULATION OF MEDIAN :

Median $= L + \left(\frac{N/2 - fcum}{f} \right)$

$= 25.5 + \left(\frac{38 - 37.5}{14} \right)$

$= 25.5 + 0.357$ (formula5 of garret)

$= 25.857$ say 25.86.

Mode : Mode is the third type average used with the test scores. It is the most commonly obtained score or the midprint of the score interval which has highest frequency.

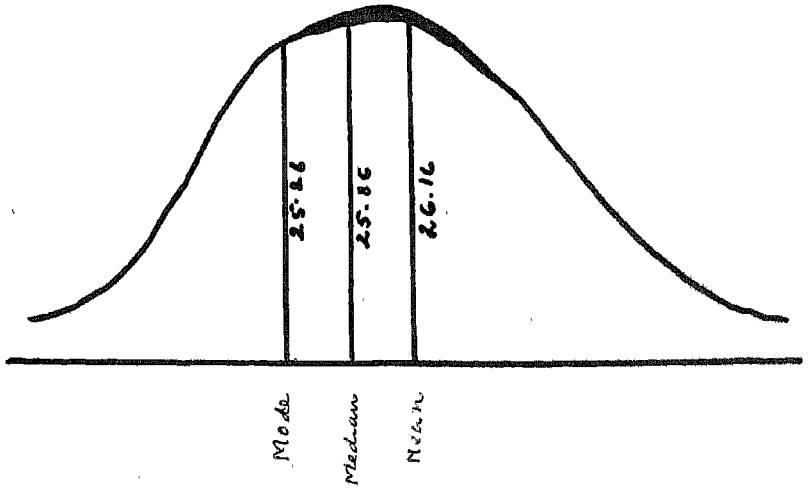
CALCULATION OF MODE :

Mode = 3 Medians - 2 MEAS (formula 6 of Garret)

$= (3 \times 25.86) - (2 \times 26.16)$

$= 25.26$

The distribution is said to be normal when the mean median and mode fall at the same score of the distribution. In this distribution median falls slightly below the mean and the mode slightly falls below the mean. It is often important for research worker to know why his distribution diverges from normal. Divergence can be known by calculating skewness and kurtosis.



The difference between the mean and the median is 0.30 only which indicates that the distribution is skewed. In order to measure the skewness the following calculation was done.

(formula 24 given by H. GARRETT on page was applied)

$$\text{skewness} = \frac{P_{90} + 10}{2} - P_{50}$$

$$SK = \frac{(L + (\frac{P_{90} - f_{com}}{f})I) + (L + (\frac{p_{10} - f_{com}}{f})I) - (L + (\frac{N/2 - f_{com}}{f})I}{2}$$

$$= \frac{(35.5 + (4.2)) + (10.5 + 2.55) - (25.5 + (\frac{33 - 27}{14})5)}{2}$$

$$= \frac{39.7 + 13.05}{2} - 25.857$$

$$= \frac{52.75}{2} - 25.857 = 26.375 - 25.857$$

$$= 0.518$$

The distribution appears to be slightly positively skewed. Positive skewness implies that fifty percent of the cases have scored less than the mean score i.e. majority of the distribution have scored less than the mean score or majority of the students have the performance which is slightly below the average score. Consequently this entails that the test constructed is slightly difficult.

KURTOSIS :

Kurtosis is a tendency, a quality of distribution which refers to peakedness or flatness of the curve plotted for the distribution.

Formula for measuring Kurtosis, as given by Garrett on page 102, is as follows :-

$$\frac{Q}{P90 - P\,10} \quad (Q = \text{Quartile Range})$$

$$\frac{\left(L + \left(\frac{3N/4 - fcum}{f}\right)I\right) - \left(L + \left(\frac{N/4 - fcum}{f}\right)I\right)}{2}$$

$$= \frac{L + \left(\frac{P90 - fcum}{f}\right)I - \left(L + \left(\frac{P10 - fcum}{f}\right)I\right)}{}$$

$$= \frac{7.075}{16.65} = 0.424$$

For a distribution to be normal, the Kurtosis is 0.263 (given by Garret on page 102). The Kurtosis measured is 0.424 which is above the given value of 0.263 which means that the distribution is slightly platikurtice.

STANDARD DEVIATION :

The standard deviation or SD is the most reliable index of variability and is customarily employed in experimental work and in research studies. It indicates the variability or dispersion within a distribution.

It is normally assumed that a group which is fairly representative of the population group must be fairly variable i.e. neither the homogeneous nor too heterogeneous. If test is conducted on homogeneous group that test would not be a reliable test because in

school situation a group can never be a homogenous one.

Too much heterogenous group mayalso yield low reliability of the test because basic assumption underlying any investigation or research is that the group to be experimented or investigated should be normally distributed.

The calculation of standard deviation in order to measure the variability of group has been done in the following way :-

$$SD = \sqrt{\left(\frac{\Sigma fx2}{4} - c\right)} I$$

$$= I \sqrt{\frac{\Sigma fx2}{N} - \left(\frac{fx^1}{N}\right)2}$$

$$= 5 \sqrt{290 - (-28)2} = 5 \quad 3.815 - 0.136$$

$$= 9.585 \text{ or } J = 9.58$$

The standard deviation of the group is 9.58.

T SCORES DISTRIBUTION :

Frequency distribution is normally converted into normalised J scores by transforming them directly into equivalent points on to normal distribution. Equivalent scores indicate same level of talent. T Scores are normalised standard scores converted into distributio with mean of 50 and standard deviation of 10.

The T scale begins at $-5\bar{0}$ and ends at $+5\sigma$ but σ is multiplied by 10 so that the mean is 50 and other divisions are 0, 10, 20, 30, 40, 50, 60, 70, 80, 90, . The calculation of T scores has been done by referring table number 44 given by Garrett

(page 316)

Frequency distribution for T scores.

Test scores.	f	cumulative. f	cum. below scores + ½ on given score.	percentage.	T Scores.
41 - 45	6	76	73	96.04	68
36 - 40	10	70	65	86.52	61
31 - 35	9	60	55.5	73.20	56
26 - 30	14	51	44.0	57.94	52
21 - 25	14	37	30	39.47	47
16 - 20	11	23	17.5	21.44	40
11 - 15	8	12	7.5	9.86	37
6 - 10	3	3	1.5	1.98	29

(T scores were directly found by refering Table given by garrett)

Please refer diagram next page.

T scaling is actually scaling of percentile values of raw scores. They are a convenient unit and are comparable having the same meaning since a reference is always to the standard scale of 100 units based upon normal probability. T scaling forces normality upon the scores of frequency distribution.

Age, as a variable, was studies and under this study two groups were formed. For group A the age range was 10 - 13 and for the group B the age range was 14-17.

Frequency distribution for group A N 24

Class intervals	frequency	x^1	fx^1	fx^2
41 - 45	1	+3	+3	9
36 - 40	7	+2	+14	28
31 - 35	3	+1	+3	3

15
12
9
6
3
0
10
20
30
40
50
60
70
80
90
100

26 - 30	5	0	0	0
21 - 25	6	-1	-6	6
16 - 20	1	-2	-2	4
11 - 15	0	-3	0	0
6 - 10	1	-4	-4	16

$$M = AM + CI.$$

$$= AM + \left(\frac{fx^1}{N}\right)I$$

$$= 23 + 1.66 = 29.66$$

$$J = J\sqrt{\frac{fx^2}{N} - \left(\frac{fx^1}{N}\right)^2}$$

$$= 5\sqrt{2.75 - 0.11}$$

$$= 5 \times 1.648$$

$$= 8.24$$

Frequency distribution for group B — N 52

Class intervals	frequency	x^1	fx^1	fx^2
41 - 45	5	+ 3	+ 15	45
26 - 40	2	+ 2	+ 4	8
21 - 35	6	+ 1	+ 6	6
26 - 30	9	0	0	0
21 - 25	10	- 1	- 10	10
16 - 20	11	- 2	- 22	44
11 - 15	7	- 3	- 21	63
6 - 10	2	- 4	- 8	32
		Total	61	208

$$M = AM + CI$$

$$= AM + \left(\frac{fx^1}{N}\right)I$$

$$= 28 + \left(\frac{-36}{76}\right)5$$

$$= 28 + \left(-\frac{45}{19}\right)$$

$= 28 - 2.368 = 25.632$

$J = I \left(\frac{fx^2}{N} \right) - \left(\frac{fx^1}{N} \right)^2$

$= 5 \left(\frac{208}{52} \right) - \left(\frac{56}{52} \right)^2$

$= 5 \quad 4 - 479$

$= 3.521 \qquad = 5 \times 1.87$

$= 9.35$

The t ratio

$t = \frac{2M1 + 2M2}{\left(\frac{N-1}{} \right)2 + \left(\frac{N}{} \right)2}$

$= \frac{(3.24)^2}{24-1} + \frac{(9.35)^2}{7.21}$

$= 4.11$

tratio $= 2.02.$

t ratio when tested with degrees of freedom 0.74 is just 2 and negligibily significant at the level of 0.01.

The mean of the group A is high. The a ge range of the group is 10 - 13 years.

Had the mean of group B whose age range is 14-17 years higher than the group A separate norms for the different age ranges would have been provided.

It appears from the means of the two groups that the younger students have faired well than the older students. The younger students, during the administration of test, appeared to be more interested. This is one of the reasons for their high scoring.

The older students of group B appeared to be shy, specifically when they were asked to reproduce the swaras in tonal memory.

On the average B group students appeared to be reluctant too towards the test since the test was not prescribed for in their carriculum. In general students now a days have a tendency not to entertain any thing which is out of their course.

The negligibly significant difference at 0.05 level may be uscribed to the sample error also. The number of the sample for all the purpose of research is a small one. Had the number of samples been large, the differences between the means would not have been statistically significant.

Under the circumstances the need for the provision of separate norms was not felt. The norms, given below, are the norms for the students ranging in a ge from 10 years to 17 years.

NORMS : Norms are the measures of achievement which represent the typical programme of the groups. Normally these are though to be as means or medians but it is always adviseable to go into details and try to have more accurate norms.

PERCENTILE NORMS :

10th $= 7.6 = L + \frac{(P10 - fcum)}{f} I$

$= 16.5 + \frac{(7.6 - 3)}{9}$

$= 16.5 + \frac{4.6 \times 5}{9} = \underline{13.05}$

20th $= L + \frac{(P20 - fcum)}{f} I$

$= 15.5 + \frac{(15.2.12)}{11} 5$

$= \underline{16.95}$

30th $= L + \left(\frac{P30 - fcum}{f}\right) I$

$= 15.5 + \left(\frac{22.8 - 12}{11}\right) 5$

$= 20.4$

40th $= L + \left(\frac{P40 - fcum}{f}\right) I$

$= 20.5 + \left(\frac{30.4 - 23}{14}\right) 5 = 23.14$

50th $= L * \left(\frac{P50 - fcum}{f}\right) 6$

$= 25.5 + \left(\frac{38 - 37}{1}\right) 5 = 25.86$

60th $= L + \left(\frac{P60 - fcum}{f}\right) I$

$= 25.5 + \left(\frac{45.6 - 37}{14}\right) 5 = 28.57$

70th $= L + \left(\frac{P70 - fcum}{f}\right)$

$= 30.5 + \left(\frac{53.2 - 51}{9}\right) 5 = 31.72$

80th $= L + \left(\frac{P80 - fcum}{f}\right) I$

$= 35.5 + \left(\frac{60.8 - 60}{10}\right) 5 = 35.9$

90th $= L + \left(\frac{P90 - fcum}{f}\right) I$

$= 35.5 + \left(\frac{68.4 - 60}{10}\right) 5 = 39.7$

The percentile scores are given above-The following cam be the norms for measuring musical aptitude.

Scores

36 - 54	very HIGH APTITUDE
28.58 - 35.9	HIGH APTITUDE
23.15 - 28.57	AVERAGE APTITUDE

16.96 - 23.14 LOW APTITUDE

0 - 16.95 VERY LOW APTITUDE

The norms given above are on the basis of percentile point. Since the distribution is not accurately normal the sigma distances between pocentile points is not equal.

However the norms mentioned above would prove to be a good criteria for measuring the musical aptitude.

RELIABILITY :

Reliability is one of the criteria of a good test. It is an Index of consistency. It implies that individual maintains his position into the group on repeatation of measurement procedure.

Reliability becomes of critical importance in research studies. In any study of prediction and in any case of improvement resulting from training, some degree of reliability in the measure of criteria being predicted or in the ability being trained is imperative if one is to achieve any prediction on the one hand or any evidence of improvement on the other.

The accuracy of prediction, which is possible to be achieved or the amount of evidence in performance which can be shown is limited by the reliability of the measure through which performance is manifested.

Statistical techniques of prediction ha-ve a lion's share in determining retiability. They save enormous efforts of either having accurately equivalent test or having the retest.

Split half method is the most easy and widely applied method which measures reliability.

SPLIT HALF METHOD :

The test is divided into two equivalent halves and the self correlation of the whole test is estimated by SPHEARMAN & BROWN PROFACY FORMULA (No.79 given by GARRETT)

The procedure in details is to make up two sets of scores by combining all alternate items in the test.

Reliability coefficient was calculated as follows.

Firstly r was calculated between scores of two halves and r is 0.47 . The formula for calculating r as given by GARRETT is as follow -

$$r = \frac{\frac{1}{x}\frac{1}{y}}{\frac{1}{x^2}\frac{1}{y^2}} = \frac{CXCY}{}$$

Thereafter self correlation has been estimated by applying SPHEARMAN BROWN PROPACY FORMULA No.79

i.e $$r_{11} = \frac{2r \frac{1}{2} \frac{1}{11}}{1 + r \frac{1}{2} \frac{1}{11}}$$

Reliability coefficient is now 0.64 (0.633) 0.64 is a moderate indice of reliability. Had the items been increased in number that is to say had the test been made longer than what it is, the reliability might have increased upto 0.9 which is supposed to be ideal reliability coefficient as shown by GUIFORD.

VALIDITY :

Validity is another important criterion of a good test. It measures how well a test does its job it is employed to do.

Validity has two aspects which may be termed as

a Relevance

b Reliability.

Relevance concerns the closeness of agreement between what the test measures and the function that it is used to measure.

Reliability on the other hand concerns accuracy and consistency with which it measures whatever it does measure in a group with which it is used.

The test constructed has been validated against external criterion of teachers rating about the students.

The correlation was found between the test scores and the scores given by the teacher (He is a music teacher)

The correlation by product moment was calculated and found to be 0.72.

This is fairly a good Index of validity. It means musical aptitude test measures to a great extent what it purports to measure.

The test constructed, however, has yielded good results.

The investigator still feels that

1. Had the number of samples been increased. (which was not possible due to limitations on time).

and

2. Had the number of items specifically in pitch discrimination area and tonal memory area been increased.

The reliability of the test might have probably increased.

FURTHER SUGGESTIONS :

1. The investigator feels that the pitch discrimination area still can be improved by adding some novel items as follows -

a) For broder discrimination students may be asked to discriminate between two ragas which has slight variation (variation of KOMAL OR SHUDDHA swaras). The SAPTK ( ) may have to be controlled.

b) for purpose of finer discrimina-tion ragas having same swaras but different eng. Rag Darbari a nd Rag JAUNPURI may be presented the swaras as well as the suptak of may be maintained .

2. Rágás have emotional appeal too. As has been mentioned already in chapter I emotional sensitivity is one of the aspect of musical aptitude.

The Chalan e of few ragas having different appeal may be presented to the students and by fixed choice method emotional sensitivity may be measured.

3. Few items may be added in the tonal memory test few swaras may be presented first and thereafter in the second presentation of the same swaras, one swara might be changed and student may be asked to mention the change if he feels and the number of the swaras which he feels is changed one in the second presentation.

4. Some times of sight reading (swaras) to be presented in written form and the student may be asked to reproduce those swaras) may be added to the tonal memory area.

BIBLIOGRAPHY - - (i) Educational measuremats by EF LINDQUIST

(ii) Statistics in Psychology and Education.
By H. Garrett a nd R.S.Woodworth.

प्रेषक :-

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मार्ग-दर्शक (Guide) :-

श्री एस0एन0त्रिपाठी,
एम0ए0एम0एड0,
विभागाध्यक्ष, - शिक्षा -
क्षेत्रीय शिक्षा महाविद्यालय,
भोपाल ।

प्रिय साथियों / बहनों ।

संगीत आपका विषय है, एक शिक्षक के नाते संगीत के साथ अध्यापन में आप पूरा - योगदान देने की चेष्टा प्रतिदिन करते हैं परन्तु भरसक प्रयासों के बावजूद भी विद्यार्थियों द्वारा प्रस्तुत किया गया " मनोहर न विविध संगीत " आपको निराश करता होगा । कभी - कभी कुछ विद्यार्थियों में आपको कुछ ऐसी झलक दिखाई देती होगी जिससे आप उन विद्यार्थियों को विशेष रूप से शिक्षा देने के लिये उन्मुख होते होंगे । अगर आपको केवल उन विद्यार्थियों को ही शिक्षा देनी पड़े जो संगीत में अभिवृत्ति रखते हैं तो शायद आपका श्रम सार्थक हो ।

मैं संगीत अभिवृत्ति मापक उपकरण निर्माण करना चाहती हूँ परन्तु मेरे प्रयासों की सफलता केवल आप लोगों के सक्रिय सहयोग पर है । निम्नलिखित प्रश्नों के उत्तर आपने शब्दों में देने की कृपा करेंगे । याद स्मरण रहे कि इस प्रकार का प्रयास हिन्दुस्तान में अभी तक नहीं किया गया है जो हमारी भारतीय संगीत पद्धति के आधार पर हो ।

भारतीय संगीत पद्धति की महत्ता के विषय पर मेरे से ज्यादा आप लोगों का अधिकार है । अगर शिक्षा का उद्देश्य " मनुष्य की सर्वांगीण प्रगति के साथ " अंतर्निहित शक्तियों का विकास है तो शिक्षक के नाते व्यक्ति में विभिन्न अंतर्निहित शक्तियों की जानकारी प्राप्त करना आवश्यक है ।

संगीत शिक्षक के नाते आपकी निश्चय ही ऐसी प्रबल इच्छा होगी कि संगीत अभिरुचि - वाले विद्यार्थियों को आपको संगीत अध्यापन करने का ज्यादा अवसर मिले ताकि उनमें निहित क्षमताओं को विकसित करने का अवसर मिले ।

कृपया निम्नलिखित प्रश्नों पर अपने अमूल्य विचार शीघ्रातिशीघ्र भेजने का प्रयत्न करें ।

सधन्यवाद

पद्मा नागपुरकार,

(1) आपकी दृष्टि से क्या आप स्वयं को " संगीत प्रेमी " या " दर्शी " समझते है ? 3 पंक्तियों में कृपया " संगीत प्रेमी " या "दर्शी " अवधारणा की विशेषताएं लिखिये ।

(2) ऐसे विद्यार्थी की विशेषता लिखिये जिसमें आपके संगीत की अभिवृत्ति का आभास होता हो (कृपया संगीत अभिवृत्ति तथा क्षमता का अंतर ध्यान में रखियेगा) संगीत अभिव्यक्ति से मेरा तात्पर्य ऐसी अर्न निहित जन्मजात शक्ति से है जो भविष्य में रूचिपूर्ण एवं सफलता की ओर अग्रेसर करती है ।

(3) पाश्चात्य संगीत पर आधारित संगीत अभिव्यक्ति मापन उपकरणों में (discrimination, power in rhythem pitch in तथा श्रेष्ठता appreciation पर जोर दिया है परन्तु मेरे विचार से विद्यार्थी का उत्तम मापन संगीत अभिव्यक्ति पर प्रकाश डालेगा तथा संगीत स्मृति ( ) सुना हुआ गायन reproduce करने की क्षमता तथा सुनने एवं स्वर के रूप आकार तथा लय की पहिचान आवश्यक है क्या आप मेरे इस मत से सहमत है ?

(4) मेरा उपकरण निम्न लिखित उपशीर्षकों का मापन करने की चेष्टा करेगा ।

(1) Pitch discrimination

(2) Pitch range (3) pitch consistency.

(3) Pitch test.

(4) Rhythem Test.

(5) Musical memory Test.

(6) Musical performance (recital given by the Student)

(5) क्या आपकी दृष्टि से और भी उपविषय गायन उपकरण में रखना आवश्यक है ? अगर है तो कौन - कौन से ?

(5) निम्नलिखित विषयों में किस प्रकार के items रखे जाय ? विभिन्न उपविषयों पर उचित की सूची देने का कष्ट करें ।

(1) स्वर परिक्षण ।

(अ) गायन योग्य आवाज है या नहीं व स्वर (Quality of voice)

(ब) आवाज की क्षमता (Range)

(स) आवाज की लगातार स्थिरता (continuity of voice)

(त) ग्रहण करने की संगीत क्षमता (Adaptation)

(द) स्मृति (याददाश्त) क्षमता (Memory Test)

Test A 3

सूचना :-

अब आपके सामने पुनः मेट्रोनोम बजाया जायगा उसी गति एवं टोनों के ध्यान से सुनिये

सूचना :-

अभी आपने जिस गति से मेट्रोनोम बजते हुये सुना उसी गति से आपको पुनः एक गिनने का कार्य करना है घण्टी की सूचना के साथ आप गिनना गिनने का कार्य शुरू कीजिये तथा पुनः घण्टी की सूचना के साथ ही गिनने का कार्य अन्त कीजिये तथा गिने हुये अंकों को Test A के 3 कॉलम के सामने लिखिये ।

Test B A

सूचना :-

आप लोग पेंसिल के साथ तैयार रहिये तथा Test B के A प्रकार को ओर अपना पूरा ध्यान रखिये प्रथम आपके सामने कुछ समय तक विशिष्ट गति से मेट्रोनोम बजेगा उसकी गति को व टोनों को ध्यान से सुनिये इस समय आपको गिनती गिनने की विधी में व गति में फरक करना होगा आपके गिनती गिनने का समय भी मेट्रोनोम उसी गति में चलेगा जिस गति में आपने प्रथम सुना परन्तु आपको इस समय गिनती 1 2 1 2 1 2 1 2 इस प्रकार गिननी है व फिर भी मेट्रोनाम की गति के दुगुनी गति में अभ्यास हेतु आपके सामने मेट्रोनाम के गति के दुगुनी गति में एक गिनने का कार्य किया जायगा के उसे गौर से देखिये ।

कृपया ध्यान रखिये कि 1 व 2 अंक गिनते हो Test B के A प्रकार के सामने खडी लकीरों के चिन्हों का प्रयोग करते हुये गिनती गिनने का कार्य चालु रखिये ।

Test B B

सूचना :-

अब आपके सामने पुनः मेट्रोनोम विशिष्ट गति से बजेगा उसके गति को व टोनों को ध्यान से सुनिये इस समय आपको पुनः गिनती गिनने के लिये में परन्तु गति में नही आपको गिनती मेट्रोनोम के टोनों के लय के दुगुन में ही परन्तु 1 2 , 1 2 3 , 1 2 , 1 2 3 इस प्रकार गिनते गिनना है तथा कि 1 2 , 1 2 3 के पश्चात् Test B के सामने खडी लकीरों के चिन्हों का प्रयोग करते हुये गिनती का कार्य चालु रखना है गिनती गिनने का कार्य घण्टीक की सूचना के साथ शुरू कर पुनः घण्टी की सूचना

गिनती की समाप्त करना है ध्यान रखिये आपके गिनती के समय मेट्रोनोम बजेगा उसकी धुनी गति से आपको 12 , 123 गिनना है अभ्यास हेतु कार्य करने की विधि का प्रदर्शन किया जा रहा है उसे गौर से सुनिये व समझिये ।

सूचना :-

तो पेन्सिल तैयार रखिये Test B B पर ध्यान दीजिये तथा आपके सामने बजाये जाने वाले मेट्रोनोम की गति व ठोके गौरसे सुन समझिये ।

Test C - A

सूचना :-

" मेट्रोनोम के अनुसार गिनती गिनने के कार्य से आप अब अच्छी तरह परिचित हो गये हैं इस वक्त आपको केवल 1 2 3 4 5 6 7 8 9 10 11 12 इस प्रकार सरल प्रकार से गिनती गिनना है तथा कोई भी नियमों का प्रयोग नहीं करना कृपया ध्यान रखें आप जिस वक्त गिनती गिनने के कार्य में व्यस्त होंगे उस वक्त भी मेट्रोनोम बजता रहेगा गिनती गिनते वक्त उसकी ओर ध्यान नहीं दीजिये घण्टी द्वारा कार्य प्रारम्भ करने की सूचना दी जायेगी व कार्य समाप्ती की सूचना पुनः घण्टी द्वारा दी जायेगी । कृपया गिने हुये अंकों को Test C व A के सामने लिखिये ।

अब आप मेट्रोनोम की गति व ठोकों को सुनिये तथा सुनने के पश्चात् घण्टी द्वारा की गिनती का कार्य शुरू कीजिये व पुनः घण्टी बजते ही समाप्त कीजिये ।

Test C - B

सूचना :-

अभी आपने किस प्रकार मेट्रोनोम के बजते हुये भी उसकी ओर ध्यान न देकर गिनती गिनी उसी प्रकार आपको फिर से 1 2 3 4 5 6 7 8 9 10 इसी प्रकार गिनती गिननी है प्रथम मेट्रोनोम की गति को सुनिये तत्पश्चात् घण्टी के आघात के साथ गिनती गिनना शुरू कीजिये तथा साथ में बजते हुये मेट्रोनोम के आघात को और गिनती गिनने के समय ध्यान न दीजिये व गिनने का कार्य घण्टी द्वारा पुनः सूचना मिलने तक जारी रखिये तथा गिने हुये अंकों को Test C के B प्रकार के सामने लिखिये ।

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-* उत्तर पुस्तिका के साथ संलग्न सूचीपत्र *-

-/ संगीत अभियोग्यता परिक्षण /-

आवश्यक सामग्री :-

(1) मेट्रोनाम (2) स्टॉप वाच (3) हारमोनियम (4) घण्टी (5) उत्तर - पुस्तिकाएँ

संगीत अभियोग्यता परिक्षण हेतु आवश्यक सूचनाएँ

Rhythem Test. (ताल व लय परिक्षण)

Test A.

Test A. शुरू करने के पूर्व बच्चों को निम्नलिखित सूचनाएँ अभ्यास (Practice) के साथ बच्चों को दी जायेगी ।

सूचना (1)

" अभी आपके सामने मेट्रोनोम बजाया जायेगा मेट्रोनोम एक बहुत ही सरल ताल काँटा है जो नियंत्रित की गई विभिन्न गतियों में केवल ठोके देने का कार्य करता है तो सुनिये मेट्रोनोम के ठोके और उसकी गति को समझिये "

सूचना (2)

अभी जिस गति से मेट्रोनोम बजते हुये आपने सुना उसी गति में आपको गिनती गिनना है

कृपया गिनती गिनने का कार्य घण्टी बजते ही चालू कीजिये तथा पुनः घण्टी बजते ही बन्द कीजिए दो घंटियों के बीच बीच के समय में आपने जितने अंक गिने उतने अंकों को Rhythem Test के A अक्षर के सामने लिखिये ।

Test A-2 :

सूचना :-

" अब आपके सामने पुनः मेट्रोनोम बजाया जायगा उसके ठोकों को गौर से सुनिये तथा गति को समझिये ।

सूचना :-

अभी आपने जिस गति से मेट्रोनोम बजते हुये सुना उसी गति में आपको गिनती गिनना है जिस प्रकार प्रथम टैस्ट में आपने घण्टी के आवाज के साथ गिनती गिनना शुरू किया तथा घण्टी के पुनः आवाज होते ही गिनती गिनना समाप्त किया

गिने हुये अंकों को Rhythem 2 के सामने लिखिये ।

(2) ताल परीक्षण

(अ) लय अण्डों के समानता (Rhythm equality)

(ब) अभ्यास करने के क्षमता (Practice Ability)

(स) तालों के अण्डों के समानता रखने की योग्यता (To keep equal parts of the Talas ability)

)

(त) ग्रहण करने के ताल क्षमता (Pick up knowledge.)

(द) स्मृति क्षमता (यादवाला) (Memory ability.)

(3) संगीत स्मृति परीक्षण (संगीत सुनकर उसी प्रकार निकालने के क्षमता)

(4) क्रियात्मक या प्रयोगात्मक परीक्षण

= = = = = = =

MUSICAL APTITUDE TEST (ANSWERS SHEET)

Class

Arts/Sci

Name

Sex

Age

School

Rhythm Test

Test A.

1.

2.

3.

Test B. (Tallies to be marked)

A.

B.

C.

Test C.

A.

2.

B.

C.

Test 3 Pitch Discription.

Test 3 Tonal memory.

A.

B.

C.

Teacher rating.

_____ Marked scrored (Investigator's ratings)

MUSICAL APTITUDE TEST

Purpose:-

To measure musical aptitude of students of higher Secondary School.

Apparatus And Material to be used:

(1) Metronom (2) Harmonium (3) Stopwabel 3 answers sheets along with instruction sheets (4) Penils.

Rhytum Test:

Test A a :- Metronome to be played at 30 beats per minute for some time metronome to be stopped.

Students to count numbers at the rate at which metronom was played.

Students to be asked to start counting numbers immediately with the sound of the bell for the whole minute. They are to stop counting after one whole minute on hearing again the sound of the bell.

Students to be used to write the last number counted before the colume of rhytum test.

A a.

Test A b:- Metronome to be played at the rate of 60 beats per minute for some time. Metronom to be stopped. After 10 second students to be asked to count numbers for the whole minute (starting and stopping of counting to be w with the sound of eletric bell).

Students to be asked to write the last number counted before the colume of rhytum.

Test A b:-

Rhytum Test A c

Metronome to be played at the rate of 90 beats per minute some time. The rest of the procedure is the same as Rhytum test A a and Rhytum test Ab

Rhytum Test B_a

Metronome to be played at the rate of 60 beats per minute for some time.
Students to be asked to count numbers as " One two one two one two " at the rate which will be double the rate at which metronome was played.
Note: Metronome will be continued at the same rate i.e. 60 beats per minute at the time of counting. This will facilitate the students to count one two one two at double rate. Students to be asked to mark tallies before Rhytum test B_a . (the details of the procedure is given in the instruction sheet) The students will do counting and marking the tallies for the whole minute. (Signed to start as well as to stop counting will be given by eletri bell).

Rhytum Test B_b

Metronome to be played at the rate of 60 minute for some time.
Students will be asked to count numbers in M (One two one and three one two one two three" at double the rate of the metronome (Metronume will be continued to while the time of the counting).
This time students are to be asked to mark one tally at the first " one " the in the round. Round consists of " one two one and three . Please refer to instruction).

Rhytum Test C_a

Metronome to be played at the rate of 60 beat per minute for some time. Metronome to be stopped. After ten seconds, students to be asked to count numbers in simple fashin as in Rhytum Test A a Ab Ac. Students to be asked to count numbers and to stop counting numbers immediately. After hearing the sound of the bell. The counting period is for one whole minute.

Note:- While students are counting numbers metronome at the rate of 30 beats per minute, is to be played and students are asked not to take coquicionce of metronome being played during the period of counting.(Rhytum tests C_a and C_b are devised to defect the effect of interpolatio of different rhytum on the basic rhytum.) Students are to be asked to write the last number counted aginst the colume of rhytum Test C_a .

Rhytum Test C_b:-

Metromome is to be played at the rate of 60 beats per minute for some time" Metronom " to be stopped after ten seconds in simple fashion(on hearing the sound of the bell) for the one whole minute. After one full minute is over elotric boll is runing and students are to be asked to stop counting the numbers and they are to be asked to write the last number counted against the columns of rhytum test C_b.

Note:- During counting period, metronom is to be played at the rate of 90 beats per minute and students are contioned not to pay attention to the beat, of the metronom. Rhytum test C_b, like, Rhytum test C_a is a devised to defect the effect of interpolation of the fast rhytum over the medium rhytum. Detailed instruction are given in the instructions sheets.

Pitch Discrimination:- Students are to be appraised of the आरोह (Seven swaras in ascending orders and अवरोह (seven swaras in discending order) the आरोह and अवरोह are to be played a harmoniumn. All the swaras to be played on harmonium are shudhama swaras.

The students are to be told that they will be two presented two swaras successively, Two. They are to discriniate between the first and second swaras presented. They are to respond to the second swar and to judge

whether the second swara is higher, lower than the first swara. Accordingly they are to mark the second swar above the line if they tuink the second swar as higher than the first. They are to mark the second swar below the base line if they tuink that the second swar is lower than the first. They ate to mark the second swar on the line if they tuink that the second swar is the same as the first one. They are to mark cross sign x accordingly.

Ist pair of Swaras :

1) Firstly. Swara सा is to be played on harmonium for five second. After to second swar रे is to be played for five second. The students are to mark the position of रे(iind swar) on the base line given against the column of Pitch discrinination.

2) Swar सा to be played on harmonium for five seconds. After a gap of five second swara म is to be played for fi five seconds. The students are asked to mark the position of म on the base line with a cross mark.

3) Swara सा to be played for five seconds and after gap of five seconds swar नी (नी मन्द सप्तक) is to be played for five seconds. The students are to be asked to play please mark the position of नी on the base line (नी is one swar below)

4) Swar सा to be played for five seconds after a gap five seconds swar ग is to be played for five seconds. The students are asked to mark the position of ग on the base line.

5) Swar सा is to be played for five seconds after five seconds swar ग is to be played for five seconds. The students are to be asked to mark the position of ग on the base line.

6) Swara रे is to be presented for five seconds. After

five seconds स्वर रे is to be played for five seconds. (Swar रे is one swar below the swar रे) students to mark the position of रे .

7) Swar म to be played for five seconds. After a gap of five seconds swar म् (one swar above म) is to be played for five seconds . Students are to mark the position of म् on the base line.

8) Swar ध is to be played for five seconds. After a gap of five seconds swar ध् is to be played for five seconds. Students to mark the position of ध् .

9) Both the swara of this group one the swaras of मन्द्र सप्तक (lowpitch range). Swar नि to be played for five seconds. After a gap of five seconds swar swar नि of मन्द्र सप्तक to be played for five seconds and the students are asked to mark the position of नि on the base line.

10.) Swar ग् is to be played for five seconds. After a gap of five seconds swar ग् is to be played for five seconds. The students are to be asked to mark the position of ग् on the base line.

Individual Test:

Tonal Memory:- The students are to be given following instructions:

" Students you will now hear few swaras you are to reproduce thbse swaras vocally. (The sequince of the swaras will be the same.)

The following are the different group of swaras to be produced before the students, One by one. After the presentable of the one group of swaras, immediately the students is to be asked to reproduce the swaras just heard. The administrator is to number of correct swaras reproduced.

The following are the group of swaras.

(1) सा , ग , रे , म ग

(2) प , ग , ध , ध , नी, ध, सां

(3) सा ग सा ग सारे गुम प

(4) मुग रेसा गरे सानी सा सा सा सा

(5) सारे गुम प प प प ध म रे

(6) धुनें सा नेध नें धुप ध धुप प

Note:- The test assumes that the administrator of the test has basic knowledge of मन्द्रमध्य सप्तक, कोमल, शुद्ध and तीव्रस्वर सुर swara sence of swara (सारे गम)

Any way, if the administrator has obsolutely no knowledge, he may plot a digram of or or swaras to be produced on harmonium. He may assume the black 5th swara as सा and then mark the position of subsequent swaras on a piece of paper. He is expected to get accustoned to the harmonium playing specially to the swaras to be played

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Scoring key for the test:

Rhytum test A_a :- The following is the scoringscheme.
The correct ansuner for this test is 30.
Mark the deviation of the number marked from 30.
The following is the range of the deviation according to which scores are to be given.

Deviation of the score from 30 on either side are t be taken.

Deviation range	Marks allotted
0 - 5	3
6 - 8	2
9 - 12	1
above twelve	0

e.g. if the ansuers given by the students is 35 The deviation would be five and he will be allotted 3 mark for this item.

Rhytum Test A_b :-

The correct ansuers is 60 the deviation of the ansuer given by the students from the correct ansuer 60 is to be taken.

Deviation range	Marks allotted
0 - 2	3
3 - 5	2
6 - 9	1
above nine	0

Rhytum Test Ac :-

The correct ansuer for this test is 90. The deviation on either side are to be taken for the scoring purposes.

The following is the scoring scheme.

Deviation range	Marks allotted
0 - 3	3
4 - 6	2

7 - 9	1
abobe nine	0

Rhytum Test B_a :-

Correct ansuer is 60. The deviation of the ansuers given from the correct anuser 60 are to be taken for scoring purpose.

Deviation range.	Marks allotted
0 - 2	3
3 - 6	2
7 - 13	1
above thriteen	0

Rhytum Test Bb :-

The correct ansuers is 24 the deviation of the ansuers given are to be taken into consideration on either side.

Deviation range	Marks allotted
0 - 7	3
8 - 10	2
11 - 17	1
above seventeen	0

Rhytum Test C A:-

The correct ansuer for the test is 60. The deviation on either side are taken into consideration for scoring purpose.

Deviation range	Marks allotted
0 - 3	3
4 - 7	2
8 - 13	1
above 13	0

Rhytum Test C_b:

The correct ansuer for this test is 60 . The deviation on either side are to be taken into consideration

Deviation range	Marks allotted
0 - 6	3
7 - 11	2
12 - 13	1
above 13	0

Pitch Discrimination:-

The scoring for this test is very simples one mark for each correct hearing of the swara is allotted. In all tuene are 10, pairs of swaras. So a students gets the maximum marks 10 if he correctly discrimination between th(swaras and according marks the position 9 the presented swaras correctly.

The following is the digramatic presentaion of the swaras

1		4	7	9	10
x	x	x	x	x	x

x	x	x	x
3	5	6	8

Tonal memory :

For each correct reproduction of the swara ½ (one half) mark is allotted. In all tuene are 46 swaras so the students who reproduce all the swaras correctly wil get maximum marks 23 .

The total score on the murical aptitude test constructed is 54

Rhytum test total score	21
Pitch discrimination	10
Tonal memory	23

Students ranging between 10 years to 17 years for measuring murical aptitude.

Scores	Very high aptitude
36 - 54	

28.58 - 35.9	High aptitude
23.15 - 28.57	Average aptitude
16.96 - 23.14	Low aptitude
0 - 16.95	very low aptitude.

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